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[54] **PLASTIC STEERING COLUMN SUPPORT MOUNTING BRACKET**

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[51] **Int. Cl.**[7] **F16M 11/00**; B62D 1/16

[52] **U.S. Cl.** **248/200**; 248/903; 280/779

[58] **Field of Search** 280/777, 779, 280/750; 74/492, 493; 188/371, 377; 248/200, 903

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Attorney, Agent, or Firm—Lawrence J. Shurupoff

[57] **ABSTRACT**

A steering column support bracket includes a molded plastic frame having a pair of laterally spaced apart side braces, a front brace interconnecting the front ends of the side braces, and an intermediate brace located between the front and rear ends of the side braces. An X-shaped truss has legs extending diagonally between the side braces and between the intermediate brace and the rear ends of the side braces.

10 Claims, 3 Drawing Sheets

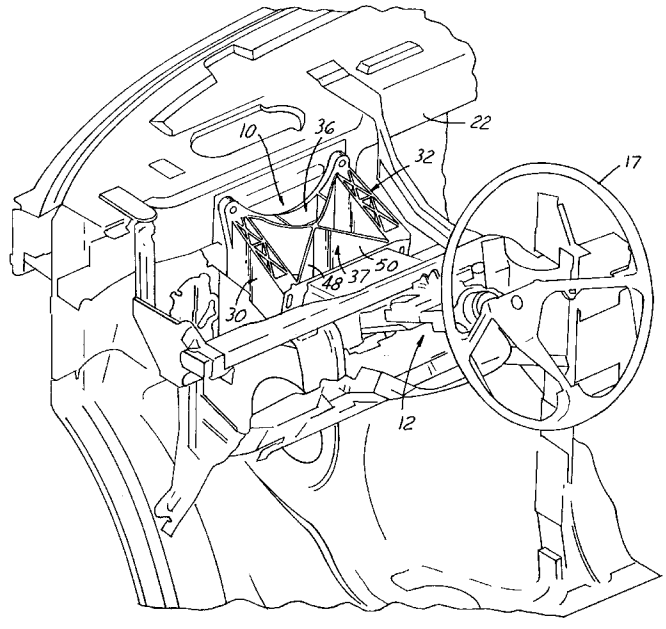
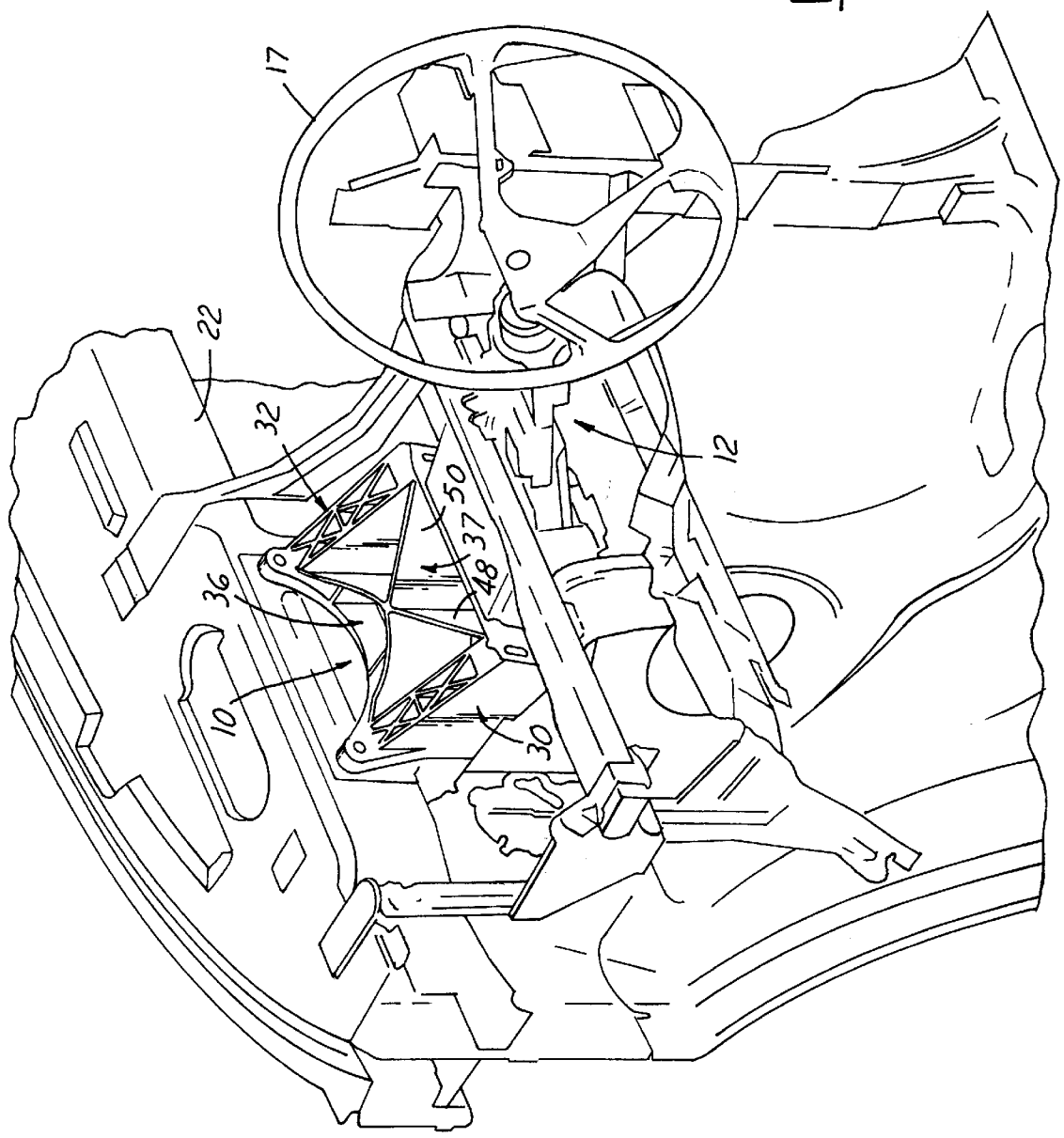
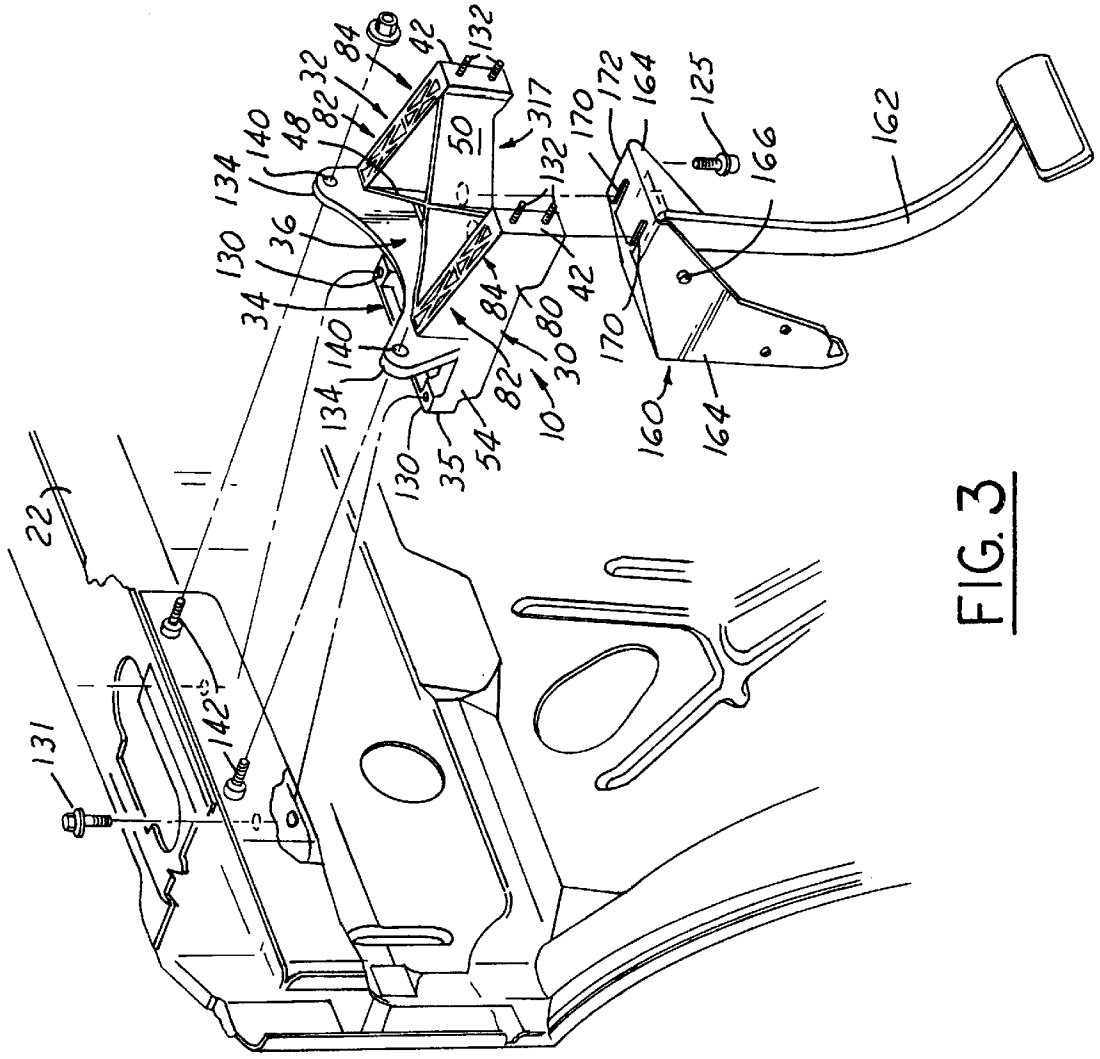


FIG. 1

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131
142
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82
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84
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317
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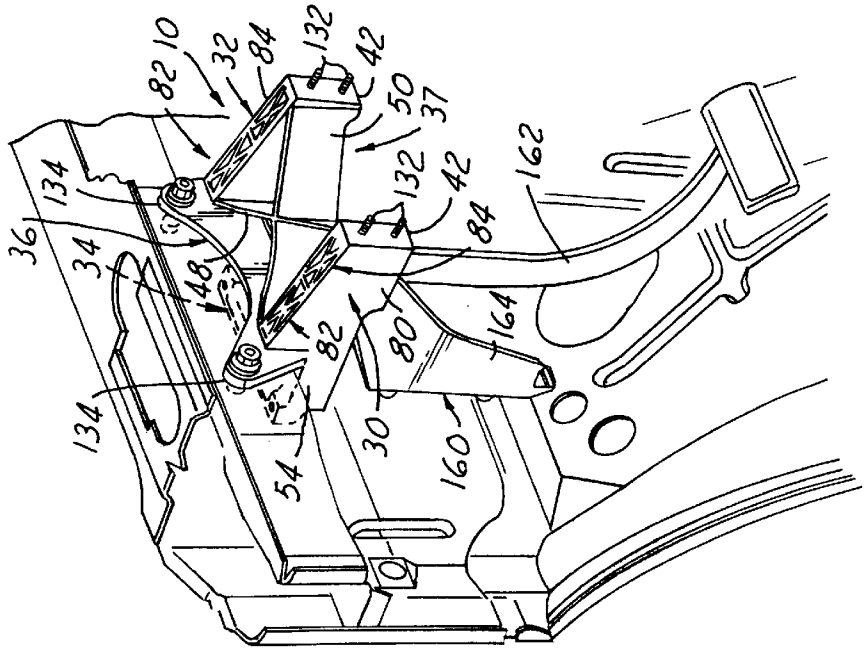
FIG. 3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160
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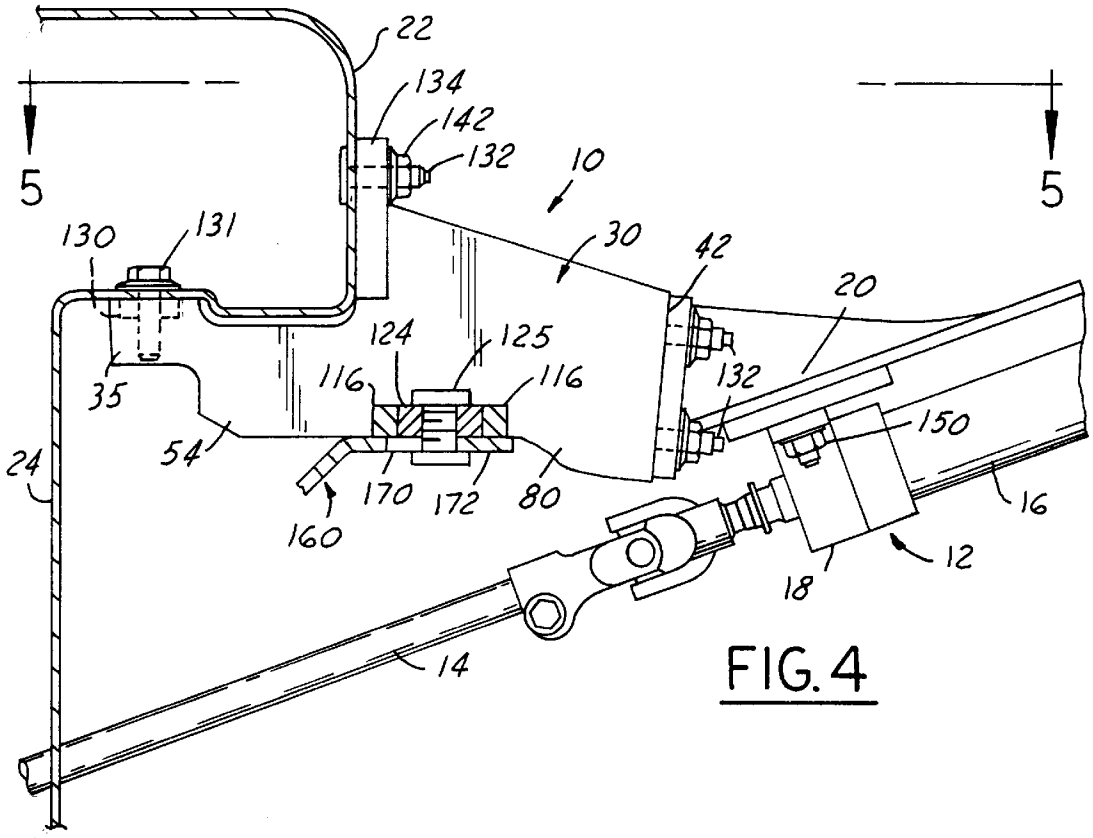
FIG. 2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134
142
132
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131
30
42
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124
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116
116
132
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150
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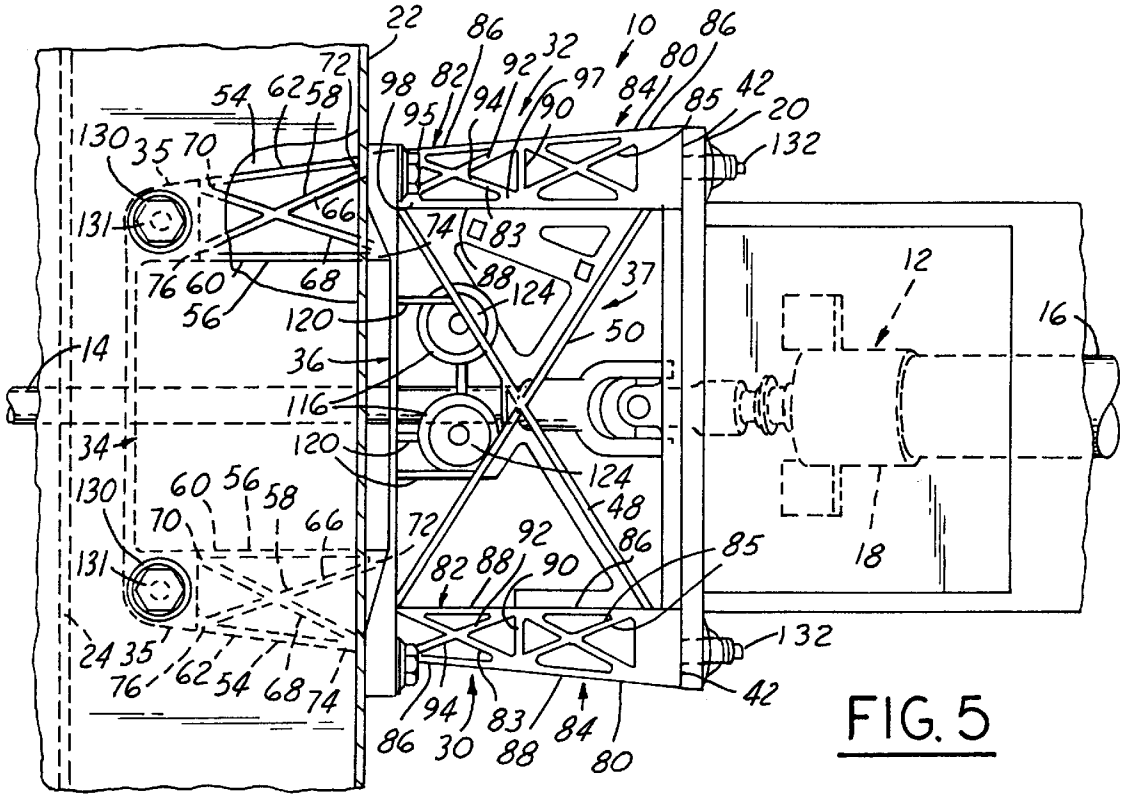
170
172
80
16
160
12
18
14

FIG. 4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130
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74
83
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68
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124
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120
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116
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120
124
130
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FIG. 5

PLASTIC STEERING COLUMN SUPPORT MOUNTING BRACKET

FIELD OF THE INVENTION

This invention relates generally to steering column support structures and more particularly to a plastic steering column support mounting bracket.

BACKGROUND AND SUMMARY OF THE INVENTION

When a vehicle is involved in a frontal impact, the steering column tends to rise. In other words, the steering column, which normally is inclined upwardly and rearwardly at a predetermined angle, will rise to a greater angle upon frontal impact. This is caused by the vehicle engine being thrust rearwardly.

The rise in the steering column places the steering wheel/air bag assembly in an unfavorable position relative to the driver's chest. When the driver's chest comes into contact with the steering wheel/air bag assembly, the force against this assembly has a considerable off-axis bending component which is increased due to the rise in the steering column. If the rise in the steering column is such that the off-axis component of force on the steering wheel/air bag assembly acts above the center of mass of the driver's chest, then the driver tends to move under the steering wheel, creating an even less favorable situation.

In accordance with the present invention, support structure is provided to insure that there is no appreciable upward rise or tilt of the steering column upon frontal impact. Preferably the steering column support structure includes a bracket in the form of a molded plastic frame having a pair of side braces interconnected by a transverse front brace and a transverse intermediate brace. An X-shaped truss has first and second legs extending diagonally between the side braces between the intermediate brace and the rear ends of the side braces.

Each side brace includes one and preferably two side trusses located between the intermediate brace and the rear ends of the side braces, and a third side truss between the intermediate brace and the front brace. Preferably a pair of mounting ears projects from the side braces for mounting purposes. A plurality of metal fastener inserts may also be molded into the frame for attachment purposes.

The bracket of this invention also provides the necessary rigidity to prevent undesirable vibration of the steering column during normal operation of the vehicle.

One object of this invention is to provide a steering column support structure having the foregoing features and capabilities.

Another object is to provide a steering column support structure which is composed of a bracket in the form of a relatively inexpensive molded plastic frame that is strong and durable and well adapted to the accomplishment of its intended function.

Other objects, features and advantages of the invention will become more apparent as the following description proceeds, especially when considered with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary perspective view showing the support bracket of this invention in association with the steering column of an automotive vehicle.

FIG. **2** is a fragmentary perspective view with the steering column removed to more clearly illustrate the support bracket.

FIG. **3** is an exploded perspective view of the parts of the structure shown in FIG. **2**.

FIG. **4** is a fragmentary side view with parts in section and parts in elevation, showing the attachment of the mounting bracket to the steering column and to the instrument panel.

FIG. **5** is a view taken on the line **5**—**5** in FIG. **4**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, the bracket **10** rigidly secures the steering column **12** against vibration during normal vehicle operation and also prevents the steering column, in a frontal impact, from rising up from the illustrated position (FIGS. **1** and **4**). The steering column **12**, as illustrated, is inclined upwardly and rearwardly at a predetermined angle and includes a steering shaft **14** extending lengthwise within a tubular jacket **16**. A steering wheel **17** is mounted on the upper end of the steering shaft **14**. A collar **18** on the steering column jacket **16** is secured to the instrument panel **20**, and the bracket **10** is secured to the instrument panel **20** and to the cowl plenum **22** of the upper dash panel **24**, all as more fully described hereinafter.

The bracket **10** includes a molded frame made of a suitable plastic material, preferably nylon reinforced with glass fibers. The frame has laterally spaced apart side braces **30** and **32**, a transverse front brace **34**, a transverse intermediate brace **36**, and an X-shaped truss **37** (FIGS. **1**–**3** and **5**).

The side braces **30** and **32** are preferably in the form of horizontally elongated, vertically disposed panels that flare apart slightly in a rearward direction. The front brace **34** is in the form of a bar that extends horizontally and has its opposite ends integrally molded to the terminal portions **35** at the front ends of the respective side braces. The intermediate brace **36** is in the form of a vertical panel, the opposite ends of which are integrally molded to the side braces intermediate the front ends and rear ends thereof.

The truss **37** has crossing legs **48** and **50** which extend diagonally between the side braces **30** and **32** between the intermediate brace **36** and the terminal portions **42** at the rear ends of the side braces. The ends of the leg **48** are integrally molded to the terminal portion **42** at the rear end of the side brace **30** and to the side brace **32** at approximately the point where the side brace **32** and the intermediate brace **36** are joined. The ends of the leg **50** are integrally molded to the terminal portion **42** at the rear end of the side brace **32** and to the side brace **30** at approximately the point where the side brace **30** and the intermediate brace **36** are joined. The legs **48** and **50** are molded integrally at the point of crossing.

The front end portion **54** of each side brace **30**, **32** includes a rectangular box frame **56** (FIG. **5**) internally supported by an X-shaped side truss **58**. The box frame **54** has laterally spaced side walls **60** and **62** integrally connected at the rear to the intermediate brace **36** and at the front to the terminal portions **35** of the side brace. The X-shaped side truss **58** within each box frame **56** has crossing legs **66** and **68**. The legs **66** and **68** are terminally, integrally connected to the side walls **60** and **62** of the box frame **54** at the corner points **70**, **72**, **74** and **76** and are integrally connected to one another at the point of crossing.

The rear end portion **80** of each of the side braces **30** and **32** is of a substantially greater vertical dimension than the

front end portions **54** thereof. Each front end portion **80** includes a front rectangular box frame **82** internally supported by an X-shaped side truss **83**, and a rear rectangular box frame **84** internally supported by an X-shaped side truss **85** (FIG. **5**). Each box frame **82** has laterally spaced side walls **86** and **88** integrally connected at the front to the intermediate brace **36** and at the rear to a transverse wall **90** separating the front and rear box frames **82** and **84** in the rear portion of each side brace. The X-shaped side truss **83** within each box frame **82** has crossing legs **92** and **94**. The legs **92** and **94** are terminally, integrally connected to the side walls **86** and **88** of the box frame **82** at the corner points **95**, **96**, **97** and **98** and are integrally connected to one another at the point of crossing. The box frame **84** of each side wall has laterally spaced side walls which are continuations or extensions of the side walls **86** and **88** of the box frame **82**. The side wall extensions connect at the rear into the terminal portion **42** of each side frame **36**. The X-shaped side truss **85** within each box frame **84** has crossing legs similar to those of the side trusses **83**, which are terminally, integrally connected to the side wall extensions at the four corner points as was the case with the legs of trusses **83** and integrally connected to one another at the point of crossing.

The side trusses **58**, **83** and **85** provide a light weight construction which is extremely rigid and resistant to distortion, deformation and twisting.

Fastener holders **116** (FIG. **5**) are molded parts of the bracket **10** connected to the legs **48** and **50** of the truss **37** and to the intermediate brace **36** and to each other by webs of plastic framing material **120**. Fixedly mounted in each of these fastener holders is a vertically disposed metal fastener **124** preferably internally threaded to receive threaded bolts **125** (FIG. **4**).

The front terminal portions **35** of the side braces **36** have vertically disposed metal fasteners **130** molded therein which are preferably internally threaded to receive threaded bolts **131**.

The rear terminal portions **42** of the side braces **36** have the heads of horizontally disposed metal fasteners **132** molded therein with the projecting shanks thereof preferably threaded. Ears **134** (FIGS. **2** and **3**) project upwardly and outwardly from the opposite side edge portions of the intermediate brace **36**. The ears **134** may also be considered portions of the side braces **36** because they are integrally molded as parts thereof as can be seen in the drawings. Holes **140** in the ears are for receiving bolts **142**.

The bolts **131** and **142** rigidly secure the bracket **10** to the cowl plenum **22** of the upper dash panel **24**. The fasteners **132** secure the rear end portion of the bracket to the instrument panel **20**. Additional fasteners **150** are provided to secure the collar **18** on the steering column to the instrument panel. Hence, the steering column **12** is rigidly secured to the bracket **10** by means of the fasteners **132** and **150**, and the bracket **10** is rigidly secured to the dash panel **24**.

The bolts **125** are provided for connecting the bracket **10** to the bracket **160** which mounts the brake pedal **162**. As shown in FIGS. **2–4**, the bracket **160** has laterally spaced side walls **164** supporting a transverse pin **166** on which the upper end of the brake pedal **162** is pivoted. In the event of a frontal impact, the engine may be pushed rearwardly and this tends to move the entire brake pedal assembly to the rear. To permit this, the openings **170** in the top panel **172** of the bracket **160** for the brake pedal, which receive the bolts **125**, are elongated to permit the bracket **160** to move rearwardly without disturbing the mounting bracket **10** for the steering column.

We claim:

1. A steering column support bracket, comprising a molded plastic frame including a pair of laterally spaced apart side braces each having front and rear ends, a front brace interconnecting the front ends of said side braces, an intermediate brace located between the front and rear ends of said side braces and connected to said side braces, and an X-shaped truss having first and second legs extending diagonally between said side braces and between said intermediate brace and the rear ends of said side braces.

2. The bracket of claim **1**, further comprising a plurality of metal fasteners molded into a rear portion of said frame.

3. The bracket of claim **1**, wherein each of said side braces comprises at least one X-shaped side truss.

4. The bracket of claim **3**, wherein each of said side braces has a box frame enclosing said at least one X-shaped side truss.

5. The bracket of claim **3**, wherein each of said side braces comprises a pair of X-shaped side trusses located between the rear ends of said side braces and said intermediate brace.

6. The bracket of claim **5**, wherein each of said side trusses further comprises a third side truss located between said intermediate brace and said front brace.

7. The bracket of claim **6**, further comprising a pair of mounting ears respectively connected to said pair of side braces.

8. The bracket of claim **7**, wherein said mounting ears are further connected to said intermediate brace.

9. The bracket of claim **8**, further comprising a plurality of metal fasteners molded into said frame.

10. The bracket of claim **9**, wherein each of said side braces has a box frame enclosing each of said X-shaped side trusses.

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